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EXAMINER	
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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/000,148	MAXWELL ET AL.
	Examiner	**Art Unit**
	Stefan Staicovici	1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-10,12-46,50 and 52-102* is/are pending in the application.

4a) Of the above claim(s) *22-44 and 67-100* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 7-10, 12-21, 45-46, 50, 52-66, 101-102* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicants' amendment filed April 21, 2006 has been entered. Claims 1-3, 7-10, 12-46, 50 and 52-102 are pending in the instant application.

Election/Restrictions

2. This application contains claims 22-44 and 67-100 drawn to a non-elected invention. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2, 7-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 005 978 A2 in view of Rousseau *et al.* (US Patent No. 5,893,955).

EP 1 005 978 A2 teaches the basic claimed process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (2) and external fibrous sheets (4) that are attached to said honeycomb core by opposing adhesive sheets (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said

external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 3, paragraph [0012] and page 4, paragraphs [0021]-[0025]). Further, EP 1 005 978 A2 teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer (see paragraphs [0016]-[0018]), wherein said support layer is an epoxy/non-woven fabric composite (see page 3, line 46).

Regarding claim 1, although EP 1 005 978 A2 teaches an epoxy/fibrous composite support layer, EP 1 005 978 A2 does not teach a substantially fibrous layer. Rousseau *et al.* ('955) teach a process for making a honeycomb structure including, providing a substantially fibrous support layer (4) in contact with a honeycomb structure (see Figure 1). Further, it is submitted that because substantially fibrous support layer (4) includes spaces between the fibers that a vacuum path is created. Therefore, it would have been obvious for one of ordinary skill in the art to provide the substantially fibrous support layer of Rousseau *et al.* ('955) as a support layer in the process of EP 1 005 978 A2 because of known advantages such as reduction of voids and reduced porosity, hence forming an improved product and also because EP 1 005 978 A2 teaches an epoxy/fibrous composite support layer, hence suggesting the use of the substantially fibrous support layer of Rousseau *et al.* ('955).

In regard to claims 2, 7-8 and 15-17, EP 1 005 978 A2 teaches a sandwich structure having an internal honeycomb core (2) and external fibrous sheets (4) that are attached to said honeycomb core by opposing adhesive sheets (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page

3, paragraph [0012] and page 4, paragraphs [0021]-[0025]). Further, EP 1 005 978 A2 teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer (see paragraphs [0016]-[0018]), wherein said support layer is an epoxy/non-woven fabric composite (see page 3, line 46).

5. Claims 1-3, 7-10, 12-21, 45-46, 50, 52-66 and 101-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lunde (US Patent No. 6,692,681) in view of Cundiff *et al.* (US Patent No. 5,851,336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* (US Patent No. 5,893,955).

Lunde ('681) teach the basic claimed process of making a composite structure including, wrapping a mandrel having a wrapped bladder (internal tool) with a sandwich structure having a central honeycomb core (24) and external fibrous sheets (20, 22) pre-impregnated with a resin, placing said wrapped mandrel in a mold (outer tool), and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see Abstract).

Regarding claims 1-2, 45 and 50, Lunde ('681) do not teach sealing the honeycomb core and a resin transfer molding process. Cundiff *et al.* ('336) teach a process for making a honeycomb sandwich, including (a) placing a first layer of an uncured adhesive film on the top side of a central honeycomb core having empty cells, and placing a second layer of an uncured adhesive film on the bottom side of the central honeycomb core; (b) placing a first layer of an uncured prepreg material (fibrous support layer) above the first layer of uncured adhesive film, and placing a second layer of an uncured prepreg material (fibrous support layer) below the second layer of uncured adhesive film; (c) placing a first layer of a dry fiber preform above the

first layer of uncured prepreg material, and placing a second layer of a dry fiber preform below the second layer of uncured prepreg material; (d) placing the charge made by steps (a)-(c) inside a mold and closing the mold; (e) heating the mold to the cure temperature of the adhesive film and the prepreg material, and holding the mold at this temperature for sufficient time to cure the adhesive film and the prepreg material; (f) reducing the temperature of the mold to the injection temperature of a selected resin transfer molding (RTM) resin system, and injecting the selected resin transfer molding (RTM) resin system into the mold; (g) holding the temperature of the mold at the cure temperature for the resin transfer molding (RTM) resin system for sufficient time to cure the resin system; and, (h) removing the product from the mold after curing is completed (see Abstract). Therefore, it would have been obvious for one of ordinary skill in the art to have sealed the honey comb core and used a resin transfer molding process as taught by Cundiff *et al.* ('336) in the process of Lunde ('681) because, Cundiff *et al.* ('336) teach that a resin transfer molding process with sealing of the honeycomb cells provides for a variety of advantages such as the ability to make complex shapes, low part variability, improved surface finish, eliminate autoclave cycle, low worker exposure, hence providing for an improved process.

Further regarding claims 1-2, 45 and 50, Lunde ('681) in view of Cundiff *et al.* ('336) do not teach a thermoplastic barrier. EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and external fibrous sheets (4) that are attached to said honeycomb core by adhesive sheets (2) and thermoplastic barrier film (3), placing said sandwich structure in a mold, injecting a resin into

said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the thermoplastic barrier of EP 0 786 330 A2 in the structure obtained by the process of Lunde ('681) in view of Cundiff *et al.* ('336) because, Lunde ('681) in view of Cundiff *et al.* ('336) specifically suggests the use of a sealed honeycomb core and also because, EP 0 786 330 A2 teaches that such a thermoplastic barrier provides for a improved sealing, hence providing for an improved molded product. Furthermore, it is noted that all references teach similar end-products and materials and as such require similar functioning characteristics.

Further regarding claim 1, Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 do not teach a substantially fibrous layer. Rousseau *et al.* ('955) teach a process for making a honeycomb structure including, providing a substantially fibrous support layer (4) in contact with a honeycomb structure (see Figure 1). Further, it is submitted that because substantially fibrous support layer (4) includes spaces between the fibers that a vacuum path is created. Therefore, it would have been obvious for one of ordinary skill in the art to provide the substantially fibrous support layer of Rousseau *et al.* ('955) as a support layer in the process of Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 because of known advantages such as reduction of voids and reduced porosity, hence forming an improved product.

In regard to claims 3 and 46, Lunde ('681) teaches a stack of material that does not include a core and a material stack that includes a core, hence Lunde ('681) teaches a material stack having a core or not having a core, depending on the desired structure.

Specifically regarding claims 7-8 and 52, Lunde ('681) teaches a multi-directional fibered material (see Abstract). It is submitted that multi-directional fibrous sheets includes a specified direction of the fibers.

Specifically regarding claim 12, Lunde ('681) teaches an external mold tool and an internal mandrel (see Abstract).

Regarding claims 14 and 57-58, Lunde ('681) teaches a non-stick layer between the mandrel and the fibrous reinforcement (see col. 10, lines 20-30). Further regarding claim 58, Lunde ('681) teaches placing the wrapped mandrel in the external clam-mold tool (see Abstract).

Specifically regarding claims 59-60, both Cundiff *et al.* ('336) and EP 0 786 330 A2 teach curing of the adhesive at or above the resin curing temperature (see page 4, line 24 of EP 0 786 330 A2). Therefore, it would have been obvious for one of ordinary skill in the art to have cured adhesive at or above the resin curing temperature as taught by EP 0 786 330 A2 in the structure obtained by the process of Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of Rousseau *et al.* ('955) because, Lunde ('681) specifically suggests the use of honeycomb core and also because, both EP 0 786 330 A2 and Cundiff *et al.* ('336) teach curing the resin to seal the honeycomb in order to provide an improved product. Furthermore, it is noted that all references teach similar end-products and materials and as such require similar functioning characteristics.

Regarding claim 61, EP 0 786 330 A2 teaches curing of the adhesive at a temperature of 25-800 ^{o}F (see page 3, line 22). Hence, it is submitted that Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* ('955) teaches combinations of materials in which the adhesive cures at a temperature below the resin curing temperature.

In regard to claims 15-17 and 62-63, Lunde ('681) teaches curing under conditions of heat, pressure and vacuum to form said composite structure (see Abstract).

Specifically regarding claims 18-21 and 64-66, although Lunde ('681) teaches an aerospace structure, that Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* ('955) do not specifically that said composite structure is an aircraft wing structure (full span and semi-span). However, the use of a composite stack having a honeycomb core to make an aircraft wing structure is well known. Therefore, it would have been obvious for one of ordinary skill in the art to have made an aircraft wing structure using the process of Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* ('955) because Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* ('955) teaches an efficient process for making an aerospace structure, hence making an aircraft wing structure and also because all references teach similar end-products and materials and as such require similar functioning characteristics. Furthermore, it is submitted that an aircraft wing must allow laminar flow of air over its surface in order to function as an aircraft wing.

Regarding claims 9-10, 13, 53-56 and 101-102, Lunde ('681) teaches a process for molding a composite part including, providing a bladder-covered mandrel (elastomeric tool),

wrapping said bladder-covered mandrel with a fiber reinforcement layer to form a wrapped mandrel, placing said wrapped mandrel in a mold, compressing said fiber reinforcement layer against the inner wall of said mold by applying an internal pressure (altering the shape and internal pressure of the inner mold) to said bladder and curing said fiber reinforcement layer under conditions of heat, pressure and vacuum to form a composite part (see Abstract). Further, Lunde ('681) teaches that said fiber reinforcement layer includes a sandwich structure having a honeycomb core and fibrous sheets (see col. 7, lines 43-54). Further, Lunde ('681) teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur (see col. 17, line 36 through col. 18, line 6). Furthermore, Lunde ('681) teaches a polyolefin or nylon (thermoplastic) bladder and a metallic clam-shell outer mold. It is submitted that a metallic mold has a different coefficient of contraction than a thermoplastic material. As such, during cooling, it is submitted that the mold in the process of Lunde ('681) in view of Cundiff *et al.* ('336) and in further view of EP 0 786 330 A2 and Rousseau *et al.* ('955) will contract more, hence altering its shape and aligning itself with the inflated bladder.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 005 978 A2 in view of Rousseau *et al.* (US Patent No. 5,893,955) and in further view of Jones *et al.* (US Patent No. 5,023,041).

EP 1 005 978 A2 in view of Rousseau *et al.* ('955) teaches the basic claimed process as described above

Regarding claim 9, EP 1 005 978 A2 in view of Rousseau *et al.* ('955) does not teach reducing the modification of fiber orientation during resin injection. Jones *et al.* ('041) teach a resin transfer molding process in which the temperature and pressure are carefully controlled in order to control the viscosity and flow of the resin matrix, hence controlling unwanted motion of the reinforcing fibers (see col. 1, lines 25-35). Therefore, it would have been obvious for one of ordinary skill in the art to have carefully controlled the temperature and pressure as taught by Jones *et al.* ('041) in the resin transfer molding process of EP 1 005 978 A2 in view of Rousseau *et al.* ('955) because, Jones *et al.* ('041) specifically teach that temperature and pressure control results in controlling unwanted motion of the reinforcing fibers, hence providing for an improved product and also because all references teach similar end-products and processes.

7. Claims 1-2, 7-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cundiff *et al.* (US Patent No. 5,851,336) in view of EP 0 786 330 A2 and in further view of Rousseau *et al.* (US Patent No. 5,893,955).

Cundiff *et al.* ('336) teach the basic claimed process for molding a honeycomb sandwich, including (a) placing a first layer of an uncured adhesive film on the top side of a central honeycomb core having empty cells, and placing a second layer of an uncured adhesive film on the bottom side of the central honeycomb core; (b) placing a first layer of an uncured prepreg material (fibrous support layer) above the first layer of uncured adhesive film, and placing a second layer of an uncured prepreg material (fibrous support layer) below the second layer of uncured adhesive film; (c) placing a first layer of a dry fiber preform above the first layer of uncured prepreg material, and placing a second layer of a dry fiber preform below the second

layer of uncured prepreg material; (d) placing the charge made by steps (a)-(c) inside a mold and closing the mold; (e) heating the mold to the cure temperature of the adhesive film and the prepreg material, and holding the mold at this temperature for sufficient time to cure the adhesive film and the prepreg material; (f) reducing the temperature of the mold to the injection temperature of a selected resin transfer molding (RTM) resin system, and injecting the selected resin transfer molding (RTM) resin system into the mold; (g) holding the temperature of the mold at the cure temperature for the resin transfer molding (RTM) resin system for sufficient time to cure the resin system; and, (h) removing the product from the mold after curing is completed (see Abstract).

Regarding claims 1-2, 7-8 and 15-17, Cundiff *et al.* ('336) do not teach a thermoplastic barrier layer. EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and external fibrous sheets (4) that are attached to said honeycomb core by adhesive sheets (2) and thermoplastic barrier film (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the thermoplastic barrier of EP 0 786 330 A2 in the structure obtained by the process of Cundiff *et al.* ('336) because Cundiff *et al.* ('336) specifically suggests the use of a sealed honeycomb core and also because, EP 0 786 330 A2 teaches that such a thermoplastic barrier provides for a improved sealing, hence providing for an improved molded product. Furthermore, it is noted that

all references teach similar end-products and materials and as such require similar functioning characteristics.

Further regarding claims 1-2 and 15-17, Cundiff *et al.* ('336) in view of EP 0 786 330 A2 do not teach a substantially fibrous layer. Rousseau *et al.* ('955) teach a process for making a honeycomb structure including, providing a substantially fibrous support layer (4) in contact with a honeycomb structure (see Figure 1). Further, it is submitted that because substantially fibrous support layer (4) includes spaces between the fibers that a vacuum path is created. Therefore, it would have been obvious for one of ordinary skill in the art to provide the substantially fibrous support layer of Rousseau *et al.* ('955) as a support layer in the process of Cundiff *et al.* ('336) in view of EP 0 786 330 A2 because of known advantages such as reduction of voids and reduced porosity, hence forming an improved product.

Specifically regarding claims 7-8, Cundiff *et al.* ('336) teaches a multi-directional fibered material (see Abstract). It is submitted that multi-directional fibrous sheets includes a specified direction of the fibers.

8. Claims 1-3, 7-8, 12, 14-21, 45-46, 50, 52 and 57-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* (US Patent No. 5,893,955).

Abbott ('466) teaches the basic claimed process of making a composite structure including, wrapping a plurality of mandrels (65, 66, 68) with a dry, fibrous material to form a wrapped mandrel, placing said wrapped mandrel in a mold, injecting a resin into said mold to impregnate said dry, fibrous material and curing said resin under conditions of heat, pressure and

vacuum to form said composite structure (see col. 10, lines 36-43 and col. 16, lines 28 through col. 17, line 20). Further, it is noted that Abbott ('466) teaches the use of honeycomb core in a pre-preg arrangement (see col. 20, lines 22-30).

Regarding claims 1-2 and 45, although Abbott ('466) teaches a honeycomb core, Abbott ('466) does not teach a sealed honeycomb sandwich structure having a thermoplastic barrier layer and an adhesive layer. EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and external fibrous sheets (4) that are attached to said honeycomb core by adhesive sheets (2) and thermoplastic barrier film (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the sandwich structure of EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an improved product. Furthermore, it is noted that both references teach similar end products and materials and as such, require similar functioning characteristics.

Further regarding claims 1-2 and 45, Abbott ('466) in view of EP 0 786 330 A2 do not teach a support layer between said honeycomb core and said adhesive layer. EP 1 005 978 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (2) and external fibrous sheets (4) that are attached to said

honeycomb core by opposing adhesive sheets (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 3, paragraph [0012] and page 4, paragraphs [0021]-[0025]). Further, EP 1 005 978 A2 teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer (see paragraphs [0016]-[0018]), wherein said support layer is an epoxy/non-woven composite fabric of glass (see page 3, line 46). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a support layer as taught by EP 1 005 978 A2 in the composite structure obtained by the process of Abbott ('466) in view of EP 0 786 330 A2 because, EP 1 005 978 A2 teaches that such a support layer provides for an improved product by controlling the flow of resin into the honeycomb cells, hence providing for an improved product.

Further regarding claims 1-2 and 45, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 do not teach a substantially fibrous layer. Rousseau *et al.* ('955) teach a process for making a honeycomb structure including, providing a substantially fibrous support layer (4) in contact with a honeycomb structure (see Figure 1). Further, it is submitted that because substantially fibrous support layer (4) includes spaces between the fibers that a vacuum path is created. Therefore, it would have been obvious for one of ordinary skill in the art to provide the substantially fibrous support layer of Rousseau *et al.* ('955) as a support layer in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 because of known advantages such as reduction of voids and reduced porosity, hence forming an improved product and also because, EP 1 005 978 A2 teaches an epoxy/fibrous

composite support layer, hence suggesting the use of the substantially fibrous support layer of Rousseau *et al.* ('955).

In regard to claims 3 and 46, Abbott ('466) teaches a stack of material that does not include a core and a material stack that includes a core, hence Abbott ('466) teaches a material stack having a core or not having a core, depending on the desired structure.

Specifically regarding claims 7-8 and 52, Abbott ('466) teaches a multi-directional fibered material (see col. 10, lines 8-12). It is submitted that multi-directional fibrous sheets includes a specified direction of the fibers.

Specifically regarding claim 12, Abbott ('466) teaches an external mold tool (60) and internal mandrel tools (65, 66, 68) (see col. 10, lines 14-35).

In regard to claim 50, EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and opposing external fibrous sheets (4) that are attached to said honeycomb core by opposing adhesive sheets (2) and an opposing thermoplastic barrier film (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the sandwich structure of EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) in view of EP 1 005 978 A2 and in further view of Rousseau *et al.* ('955) because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an

improved product. Furthermore, it is noted that all references teach similar end-products and materials and as such require similar functioning characteristics.

Regarding claims 14 and 57-58, Abbott ('466) teaches a non-stick layer between the mandrel and the fibrous reinforcement (see col. 10, lines 35-43). Further regarding claim 58, Abbott ('466) teaches placing the wrapped mandrels in the external mold tool (60) (see col. 10, lines 14-35).

Specifically regarding claims 59-60, EP 0 786 330 A2 teaches curing of the adhesive at or above the resin curing temperature (see page 4, line 24). Therefore, it would have been obvious for one of ordinary skill in the art to have cured adhesive at or above the resin curing temperature as taught by EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) in view of EP 1 005 978 A2 and in further view of Rousseau *et al.* ('955) because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an improved product. Furthermore, it is noted that all references teach similar end products and materials and as such, require similar functioning characteristics.

Regarding claim 61, EP 0 786 330 A2 teaches curing of the adhesive at a temperature of 25-800 ^{o}F (see page 3, line 22). Further, EP 1 005 978 A2 teaches an epoxy RTM resin curing temperature of 356 ^{o}F (180 ^{o}C) (see page 4, paragraph [0025]). Hence, it is submitted that Abbott ('466) in view of EP 1 005 978 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) teaches combinations of materials in which the adhesive cures at a temperature below the resin curing temperature.

In regard to claims 15-17 and 62-63, Abbott ('466) teaches curing under conditions of heat, pressure and vacuum to form said composite structure (see col. 10, lines 36-43 and col. 16, lines 28 through col. 17, line 20).

Specifically regarding claims 18-21 and 64-66, Abbott ('466) teaches that said composite structure is an aircraft wing structure (full span and semi-span) (see col. 2, lines 50-65). It is submitted that an aircraft wing must allow laminar flow of air over its surface in order to function as an aircraft wing.

9. Claims 9-10, 13, 53-55 and 101-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Lunde (US Patent No. 6,692,681 B1).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) teach the basic claimed process as described above.

Regarding claims 9-10, 13 and 53-55, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) do not teach reducing the modification of fiber orientation during resin injection by using an internal elastomeric tool. Lunde ('681) teaches a process for molding a composite part including, providing a bladder-covered mandrel (elastomeric tool), wrapping said bladder-covered mandrel with a fiber reinforcement layer to form a wrapped mandrel, placing said wrapped mandrel in a mold, compressing said fiber reinforcement layer against the inner wall of said mold by applying an internal pressure (altering the shape and internal pressure of the inner mold) to said bladder and

curing said fiber reinforcement layer under conditions of heat, pressure and vacuum to form a composite part (see Abstract). Further, Lunde ('681) teaches that said fiber reinforcement layer includes a sandwich structure having a honeycomb core and fibrous sheets (see col. 7, lines 43-54). Furthermore, Lunde ('681) teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur (see col. 17, line 36 through col. 18, line 6). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a bladder-covered mandrel as taught by Lunde ('681) in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) because, Lunde ('681) specifically teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur, hence providing for an improved product and also because all references teach similar materials and end-products.

Regarding claims 101-102, Abbott ('466) teaches metallic molds and polymeric resin. Lunde ('681) teaches a polyolefin or nylon (thermoplastic) bladder. It is submitted that a metallic mold has a different coefficient of contraction than a thermoplastic material. As such, during cooling, it is submitted that the mold in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Lunde ('681) will contract more, hence altering its shape and aligning itself with the inflated bladder.

10. Claims 9 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Jones *et al.* (US Patent No. 5,023,041).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) teach the basic claimed process as described above.

Regarding claims 9 and 53, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) do not teach reducing the modification of fiber orientation during resin injection. Jones *et al.* ('041) teach a resin transfer molding process in which the temperature and pressure are carefully controlled in order to control the viscosity and flow of the resin matrix, hence controlling unwanted motion of the reinforcing fibers (see col. 1, lines 25-35). Therefore, it would have been obvious for one of ordinary skill in the art to have carefully controlled the temperature and pressure as taught by Jones *et al.* ('041) in the resin transfer molding process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Rousseau *et al.* ('955) because, Jones *et al.* ('041) specifically teach that temperature and pressure control results in controlling unwanted motion of the reinforcing fibers, hence providing for an improved product and also because all references teach similar end-products and processes.

11. Claims 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955), Jones *et al.* (US Patent No. 5,023,041) and Lunde (US Patent No. 6,692,681 B1).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Jones *et al.* ('041) teach the basic claimed process as described above.

Regarding claims 54-55, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Jones *et al.* ('041) do not teach an internal elastomeric tool. Lunde ('681) teaches a process for molding a composite part including, providing a bladder-covered mandrel (elastomeric tool), wrapping said bladder-covered mandrel with a fiber reinforcement layer to form a wrapped mandrel, placing said wrapped mandrel in a mold, compressing said fiber reinforcement layer against the inner wall of said mold by applying an internal pressure (altering the shape and internal pressure of the inner mold) to said bladder and curing said fiber reinforcement layer under conditions of heat, pressure and vacuum to form a composite part (see Abstract). Further, Lunde ('681) teaches that said fiber reinforcement layer includes a sandwich structure having a honeycomb core and fibrous sheets (see col. 7, lines 43-54). Furthermore, Lunde ('681) teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur (see col. 17, line 36 through col. 18, line 6). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a bladder-covered mandrel as taught by Lunde ('681) in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Jones *et al.* ('041) because, Lunde ('681) specifically teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the

fibers such that stretching and residual stresses do not occur, hence providing for an improved product and also because all references teach similar materials and end-products.

Regarding claim 56, Jones *et al.* ('041) teach a resin transfer molding process in which the temperature and internal pressure are carefully controlled in order to control the viscosity and flow of the resin matrix, hence controlling resin flow rate (see col. 1, lines 25-55). Therefore, it would have been obvious for one of ordinary skill in the art to have carefully controlled the temperature and internal pressure as taught by Jones *et al.* ('041) in the resin transfer molding process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Rousseau *et al.* ('955) and Lunde ('681) because, Jones *et al.* ('041) specifically teach that temperature and pressure control results in controlling the resin flow rate, which in turn controls unwanted motion of the reinforcing fibers, hence providing for an improved product and also because all references teach similar end-products and processes.

Response to Arguments

12. Applicants' remarks filed April 21, 2006 have been considered.

13. Applicants argue that the art of record does not teach or suggest, either alone or in combination, the limitation of "applying a substantially fibrous support layer on at least one of the first side and second side of the core section, wherein the substantially fibrous support layer provides a vacuum path for evacuation of the core section" (see pages 24-30 of the amendment filed 4/21/2006). However, this argument is drawn to a newly presented claim limitation not previously presented that has been rejected in this Office Action as set forth above.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson, can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

Stefan Staicovici 7/10/06

Primary Examiner

AU 1732

July 10, 2006